THE SALMON TROUT.

By M. Allport, F.Z.S., F.L.S.

Read 8th August, 1871.

Much doubt having been expressed by scientific men in England as to whether young fish have really been reared in this colony from one species of migratory salmon, viz., the salmon trout *(Salmo trutta)*, without allowing the parent fish first to make the usual journey to sea, it was thought advisable to send one of such parent fish (which had twice deposited ova) to England, for the examination of all persons interested in that which will probably prove the most useful discovery in pisciculture yet made.

Accordingly such parent fish was, in March last, sent to the Zoological Society of London, together with two young fish of different ages, the progeny of similar parents.

By last mail Mr. Youl forwarded the following letter from Dr. Günther in reference to these fish :—

British Museum,
13th June, 1871.

Dear Sir,—I have examined the three salmonoids sent by Mr. Morton Allport, and mentioned in his letter directed to you, and dated March 15th.

(1.) The larger specimen is very interesting; it is a female fish, with the ovaries well developed. With regard to the external characters, it agrees perfectly with the migratory sea-trout; it has the dentition and scales, caudal fin, and præoperculum of that species; it shows also ten parr marks, a number met with only in migratory species.

On the other hand, it has only thirty-six pyloric appendages, a number which I have never met with in purely bred migratory salmonidæ, but very commonly found in the river-trout and hybrids between river and sea-trout. (See my Catalogue of Fishes, &c., p. 27.) I think that this specimen does not serve to convince the sceptical that one species of migratory salmon will thrive in fresh water. The coloration of this specimen is altogether peculiar, and I have never seen a fish marked with spots so deeply black, so large, and so numerous as in this specimen. In ordinary sea-trout of the same size the parr marks would have disappeared, but here they are present, and their co-existence with the black spots gives to this specimen quite a peculiar appearance.

I need not give my determination of the species of the two smaller fish, as it appears from Mr. Allport's letter that he is acquainted with the parent fish; but I think it right to state the principal characters, which may lead to a proper determination of these fish.

(2.) The larger, in smolt dress, has eleven series of scales below the adipose fin, 47 pyloric appendages, deeply cleft caudal; parr marks entirely absent.

(3.) The parr has 10 parr marks, 11 series of scales below the adipose fin, 47 pyloric appendages, and deeply cleft caudal.

I remain, &c., &c.,

J. A. Youl, Esq. (Signed) A. Gunther.

Before considering this letter, I desire to express my sense of the great obligation the Salmon Commissioners and the colony are under to Dr. Günther for the trouble he has, on several occasions, taken to help us to a correct determination of the species of the various salmonoids sent to England, and to state that, whenever I have arrived at a somewhat different conclusion from so able an ichthyologist, it has been from a conviction that we have much to learn on this important subject, which no experiments yet tried in Europe have been sufficient to elucidate.

First, then, it would appear that in every external feature except colour the large or parent fish coincided absolutely with the description of the salmon trout *(Salmo trutta)*, but that certain peculiarities of colour, and, on dissection, the presence of only 36 pyloric appendages led Dr. Günther to doubt whether this specimen would convince the sceptical that one species of migratory salmon will thrive in fresh water.

But, upon reading Dr. Günther's own details of his examination, can any one doubt that this parent fish was a pure salmon trout ? And would it not have been amazing had it proved otherwise, for this fish was hatched, not from an egg laid here, but from one of the English eggs, and, if a hybrid, those who obtained the ova must wilfully and maliciously have played a trick upon all engaged, at great expense, in carrying out the experiment—a conclusion not easily arrived at by those who know Messrs. Youl and Ramsbottom.

As to the peculiarities of colour: variation in colour amongst fish, even where the circumstances are most favourable to healthy development, occurs so frequently that no one should be surprised at the peculiarities displayed by this specimen after its unnatural detention in fresh water. With true salmon *(Salmo salar)*, if smolts are detained in fresh water till the season for migration is past, the parr marks reappear. (See Proc. Zool. Soc., 1868, part 2, p. 247.) Before you is a beautiful specimen exhibiting this peculiarity ; it was hatched from one of the English eggs of *Salmo salar*, and died after having put on the smolt scales twice, and twice returned to the parr markings when the period for migration was past. As many present may remember, when the parent fish sent to England was first placed in spirits the parr marks were scarcely visible, but they became more intense afterwards, and, from Dr. Günther's description, must have darkened considerably on the voyage.

On those parent fish which remain in the pond, the parr marks are most apparent immediately after the spawning time, and the fish get gradually more and more silvery till the height of summer.

The deficiency in the number of the pyloric appendages seems far more difficult to account for than the mere variation in colour; yet even in this case may not variation be due to the unnatural detention in fresh water? It is certain that the number of these appendages varies greatly in individuals belonging to the same species. Dr. Günther gives 36 as the normal number for the river-trout *(Salmo fario)*, yet I have found more than 40 in several specimens undoubtedly belonging to the latter species.

One of the parent salmon trout from our pond, a male, which died nearly a year before that sent to England, and which is now in the Museum, was dissected in my presence by our curator, Mr. Roblin, who carefully counted the pyloric appendages, and found 47. With these facts before us, we should not place too much reliance on the number of the pyloric appendages as a specific test. Such facts only show the difficulty of what Dr. Günther, in his preface to the Catalogue of the Fishes in the British Museum, vol. 6, 1866, calls "finding a way through this vast labyrinth of variation of character in the salmonidæ."

Dr. Günther speaks of having found 36 pyloric appendages in hybrids between river and sea-trout; but where were such hybrids obtained, and how was the fact of their being such hybrids authenticated? To obtain a hybrid between these fish, at the same stage of growth as the parent fish sent hence, the ova and milt must have been obtained, the fish hatched and carefully attended to for four years by competent persons. Has this ever been done?

After all, the fact that the parent fish, in every minute external detail of measurement, corresponded exactly with the true salmon trout, and differed totally from the true river-trout, while in colour it resembled neither, proves that it was no hybrid beween those fish; and the circumstance of its having the same number of pyloric appendages as such hybrids therefore matters little.

With regard to the two smaller fish examined by Dr. Günther, his written descriptions correspond with those of the young of true salmon *(Salmo salar)*. Yet these were bred from eggs deposited by fish which never went to sea, and which externally are identical with the large parent fish sent to England; and I am, therefore, driven to the conclusion that, at this early period of their growth, the migratory species of salmon cannot, with any degree of certainty, be distinguished from one another.